SMOKE MACHINE SERVICE MANUAL

Martin

Jem

MAGNUM 800

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JEM Smoke Machine Training Program

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AN INTRODUCTION TO SMOKE TECHNOLOGY

Smoke Machine Markets

Jem / Martin smoke machines are categorised into 2 ranges: The ***Professional*** and the ***Club / DJ*** range.
If a product is branded as a "Martin" product this is aimed at the ***Club / DJ*** market.
All products branded as a "JEM" product are classed as ***Professional*** and are aimed at the higher end touring / installation market.
All JEM / Martin Smoke products can be used across both of the different markets without any ***compromise of performance or features.***

Smoke machine principles:

All JEM / Martin ***conventional*** smoke machines utilise the same technology:

In Brief:

> When the ***run button*** on the ***remote*** is pressed, ***smoke fluid*** is pumped from a removable ***container*** situated within the machine via the flexible fluid pipe into an ***oscillating piston pump***.
> The ***fluid*** passes through the ***pump*** and enters the ***heat exchanger*** were the ***fluid is vaporised*** and exits as thick, white ***smoke.***

The ***heat exchanger*** is comprised of a ***heating element*** and a ***coil*** of copper or steel tubing between 3 and 6 metres in length. This is cast into a mass of ***aluminium***.

The ***heat exchanger*** is heated via the ***heating element***.
This is controlled by a ***J Type thermocouple*** fitted to the ***heat exchanger.***
The ***temperature*** is determined by the ***calibration*** of the ***main control PCB***.

Once the working ***temperature*** is reached, the ***main control PCB*** will allow the ***pump*** to be operated and the machine will now be ready to ***run***.

Haze machine principles:

The JEM ZR24/7 and Magnum Hazer work on the same smoke generation principles as the JEM / Martin smoke machines.
The only difference is the smoke output on a hazer exits into a ***metal chamber*** where there is a ***fan*** creating a ***fast moving air stream***. This air stream ***disperses*** the smoke output and creates the ***haze***.

Again the principles are identical to that of a ***conventional*** smoke machine.
There is a ***pump, heat exchange, PCBs*** and ***onboard controls***. The major difference is the ***air chamber***.
A ***radial fan*** is used with this system. It is used to allow the exiting smoke to have the ***maximum dispersal***.
As with several of the smoke machines, the haze machine has a ***low fluid shut off*** system. This is an ***electronic temperature control device*** that measures the ***temperature*** of the ***heat exchange*** over a short period. If the ***temperature*** has not changed but the unit has been ***pumping***; the unit will assume that the system has ***run out of fluid*** and shut down. ***This prevents the system from running dry and burning out the pump.***

CE mark

All products that are produced by JEM / Martin carry the ***CE Certification***.
These products meet the requirements of the following ***EC Standards*** and as such, comply with the ***EMC (Electromagnetic Compatibility)*** and ***LVD (Low Voltage Directives)***, directives of the ***European Community***:

EN 50 081-1 1992 Generic Emission Standard for domestic and light Industrial environments.

EN 50 082-1 1992 Generic Immunity Standard for domestic and light Industrial environments.

EN 60 335-1 1995 Safety of household and similar electrical appliances

These standards reference the following European standards:

Emissions:

EN 55 022 /B	RF voltage and field strength
EN 60 555	Harmonic current content
EN 55 014	RF voltage (discontinuous)

Immunity:

IEC 801-2	Electrostatic discharge to case
IEC 801-4	Common mode fast transients

These standards also meet the requirements of ***CISPR 22***.

JEM did not carry the ***CE*** mark on products that were produced prior to 1995.
These products can be identified by either the ***DIN/XLR*** socket on the rear or top of the unit or the ***Mains PCB***:
If the unit has a ***5 pin DIN*** or a ***4 pin XLR*** without the ***CE*** text on the rear, the unit is classed as ***NON-CE***.
If the PCB has a ***12 pin Molex*** connector fitted to it, this is classed as a ***NON-CE*** unit.

Searching for information on the INTERNET

If you require information with regards to JEM / Martin Smoke, Haze and Heavy Fog products an ideal place to start is the Internet.

Martin has a dedicated team of staff who are constantly monitoring and updating the information that is placed onto the ***INTERNET***. This is to ensure that the best possible service is being given to not just dealers and end users but also to internal staff.

Locating information is simple:

First go to: ***www.jemsmoke.com***

Here you will find information on all of our current range of products including news, bulletins, specifications and even videos of machines in action.

To access support information:

On the left hand side of the screen there are several different categories.

Click on ***SUPPORT***.

This will bring you to the ***SMOKE USER SUPPORT*** page.

If you have a ***LOGIN NAME AND PASSWORD*** then press the ***LOGIN*** icon at the top of the page and enter your username and password into the relevant boxes.

(If you do not have a ***LOGIN NAME*** you can still use the site, just with limited access to information)

Select ***SMOKE*** from the menu on the left hand side.

Go to the ***PRODUCTS MENU*** and choose the ***PRODUCT*** you require information on.

Now go to the ***CATEGORY*** menu and select which piece of information you require (parts,manuals,etc)

Once you have done this press the ***SEARCH*** icon.

All of the information relevant to the product you have chosen will now be displayed.

A LOGIN is required for access to ***TECHNICIAN*** and ***DISTRIBUTOR SUPPORT*** areas.

Please direct all inquires regarding access to your national distributor.

Which fluid can I use with my machine?

X=NO O=YES	Pro-Smoke Studio DX Mix	Pro-Smoke Super ZR Mix	Pro-Smoke High-density SP Mix	I-Fog	Reg. DJ Fluid	Party Pack	Pro Haze	Heavy Fog Fluid B2 Mix	Heavy Fog Fluid C3 Mix
MAGNUM 800	**O**	**O**	**O**	**O**	**O**	**X**	**X**	**X**	**X**

What can my machine do?

Dance clubs and discos the world over greatly appreciate this industry workhorse.
This reliable yet compact fog machine delivers a non-stop intense cover of fog for instant atmosphere generation – a must for any mobile DJ or small club.

Easy to operate with a convenient carrying handle and portable design, the Magnum 800 uses the same high technology standards found in the larger Magnum 2000.

The Magnum 800 is tough and rugged, the perfect fogger for small nightclubs, mobile DJs and bands. It is also a useful fogger for parties and celebrations.

Specifications:

Physical	Length: 410 mm Width: 165 mm Height: 170 mm Dry weight: 6.5 kg
Performance	Max. smoke output (approx.): 200 m^3 per minute Max. operating time at full output (approx.): 38 mins Operating time: Continuous, automatic level adjustment Warm-up time: Approx. 7 minutes
Control and Programming	Control options: Remote control (supplied) or DMX with optional DMX interface module Remote control features: Instant or timer-controlled output, 0-100% adjustable output level
Fluid System	Fluid pump: Oscillating piston, high pressure Onboard fluid capacity: 1 l Max. fluid consumption at peak output: 50 ml per minute
Construction	Housing: Steel & aluminium Heat exchanger: 750 W, direct thermal protection
Installation	Orientation: Floor (No Flying Kit Available)
Connections	Remote control: 5-pin DIN Power connection: 3-pin IEC male socket DMX (with optional DMX interface): 3-pin locking XLR

Electrical

AC power (EU models): 220-240 V nominal, 50 Hz
AC power (US models): 110-120 V nominal, 60 Hz
Main fuse (220-240 V power): 5 AT (slow blow)
Main fuse (110-120 V power): 10 AT (slow blow)

Typical Power and Current

US model
110 V, 60 Hz: 820 W, 7.45 A
115 V, 60 Hz: 896 W, 7.79 A
120 V, 60 Hz: 975 W, 8.13 A
EU model
220 V, 50 Hz: 630 W, 2.86 A
230 V, 50 Hz: 689 W, 3.00 A
240 V, 50 Hz: 750 W, 3.12 A
Measurements made at nominal voltage. Allow for a deviation of +/- 10%.

Thermal

Maximum ambient temperature (Ta max.): 40° C
Exterior surface temperature, steady state: 50° C
Max. nozzle temperature: 200° C

Approvals

EU safety: EN 50 081-1, EN 50 082-1
EU safety: EN 60 335-1 (1995)

Accessories

Pro Smoke Studio (DX Mix) fluid, various sizes available
Pro Smoke Super (ZR Mix) fluid, various sizes available
Pro Smoke Super (Fragranced) fluid, various sizes available
Pro Smoke High Density (SP Mix) fluid, various sizes available
I-fog fluid, various sizes available
Ducting Kit (Including adapter and 5m of 4-inch (104mm) ducting): P/N 92625004
DMX Interface ZR12: P/N 92765015

Ordering Information

Martin Magnum 800, 110 V: P/N 92220001
Martin Magnum 800, 240 V: P/N 92220000

Service Info (internal only - do not publish)

Cooling time before service or maintenance: 15 minutes
Minimum clearance around air vents: 0.20 m

SERVICE OF MACHINES

TOOLS AND THINGS:

For successful servicing of a machine you will need some basic tools which are in good working order and the right size for the job. Other tools / equipment are available for specific jobs but in most cases these are not needed for general service.

Equipment needed:

Screwdrivers
- Pozidrive, size 1 and 2
- Flat tip, size small and medium

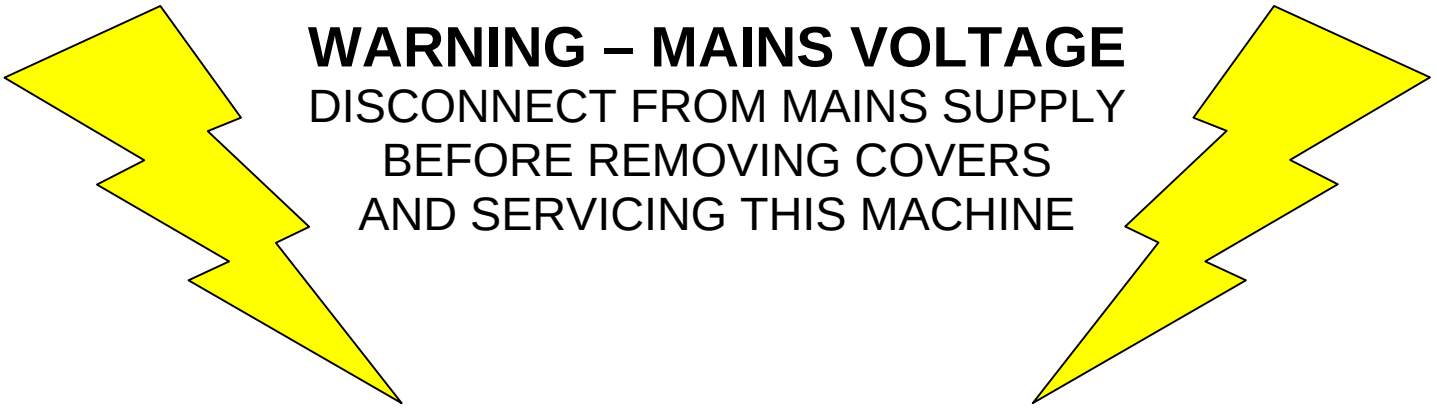
Wrenches
- 7mm
- 12mm x2

Pliers
- Needle Nose, small
- Wire Cutters, small

Digital Multi Meter (With ability to measure mV)

Additional Items / recommended:

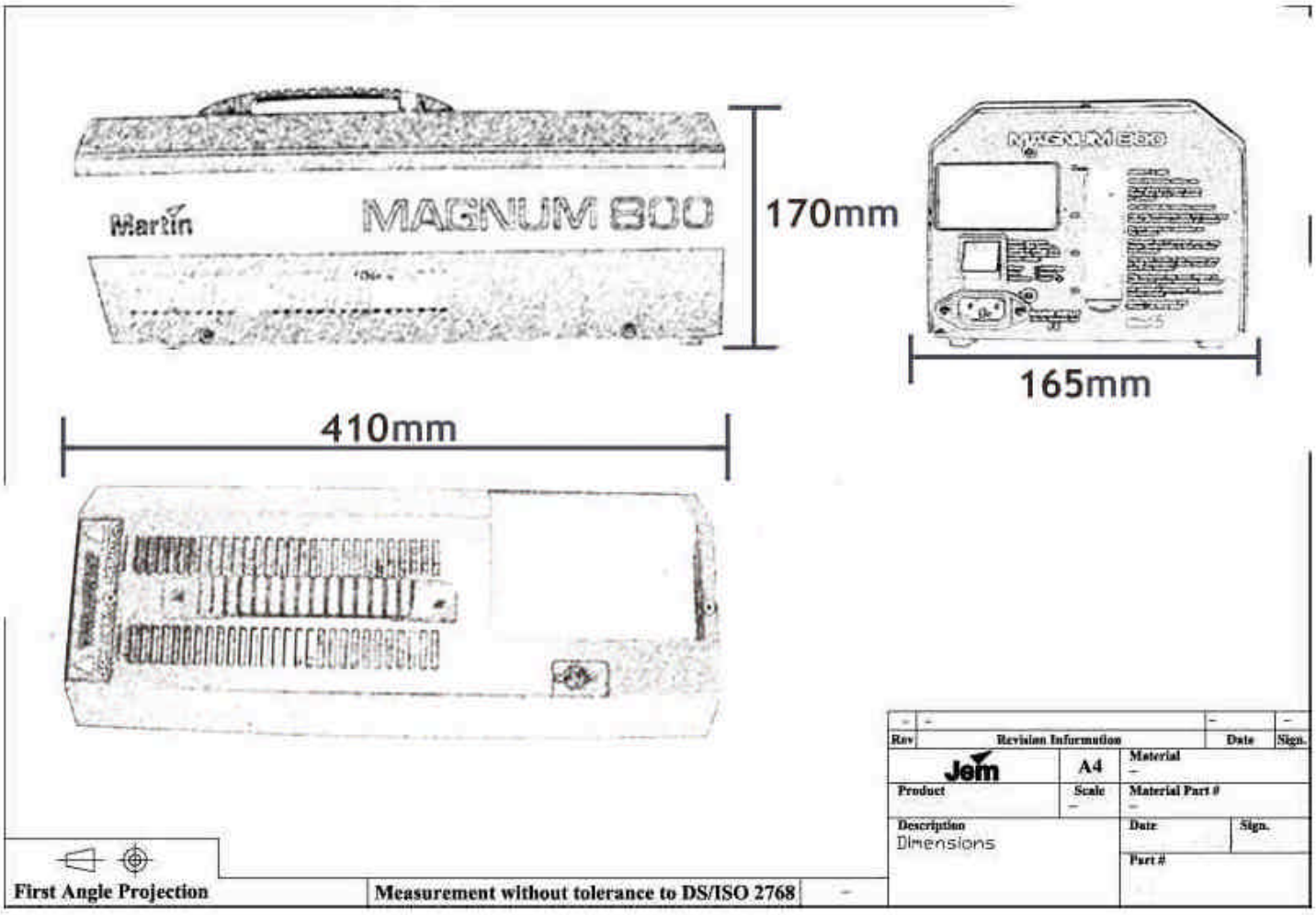
Cable Ties (***p/n 13104000***)
Silicone Sealant
JEM Calibration Box (***p/n 92620005***)
Paper towels (or other absorbent material)
Ammeter (For measuring current draw of machine – could be handheld or bench mounted)
Epsilon 5 Portable ISP Programmer ***(p/n 50502004)***
Common Sense !!



PROCEED WITH EXTREME CAUTION

MAGNUM 800 MACHINE OVERVIEW

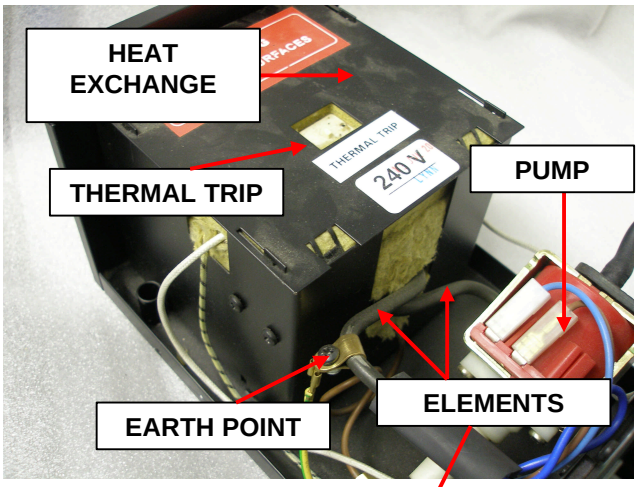
The Outside:

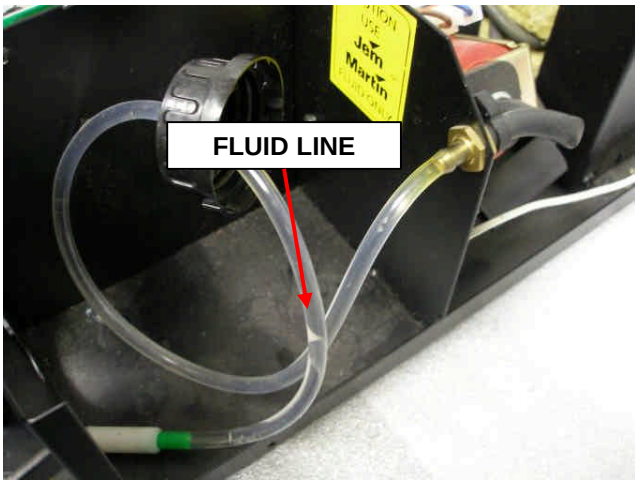


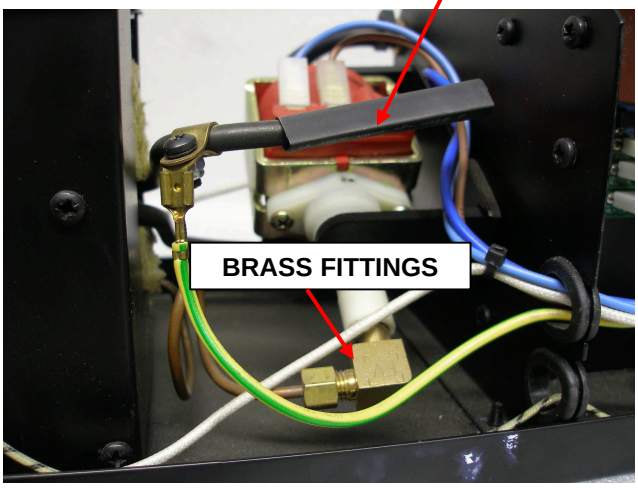
Opening The Machine:

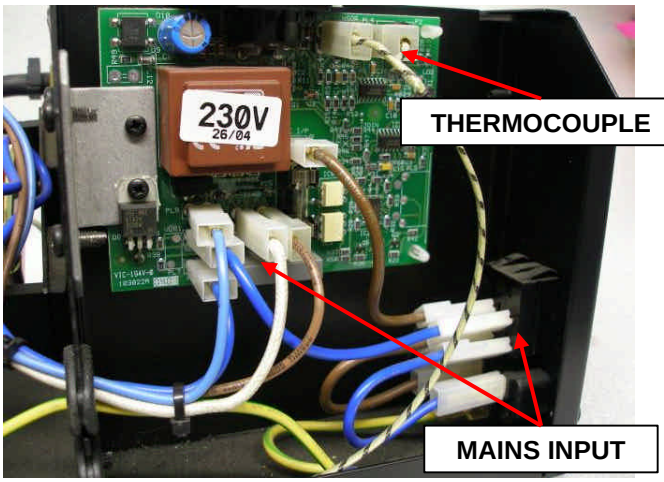
1. ***DISCONNECT FROM MAINS SUPPLY.***
2. Remove the 6 M4x10 pozidrive TAPTITE screws from the outside of the machine and store safely.
3. Lift off the lid.

The Inside:





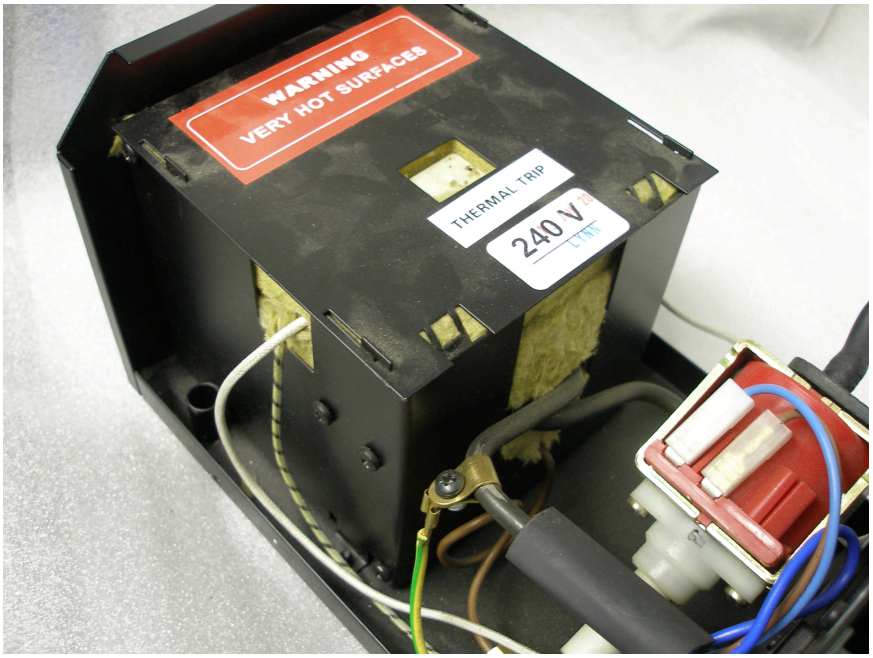




HOW TO….

REFER TO SCHEMATICS / DIAGRAMS IN THE APPENDIX FOR MORE DETAILS

How To Change A Heat Exchange:



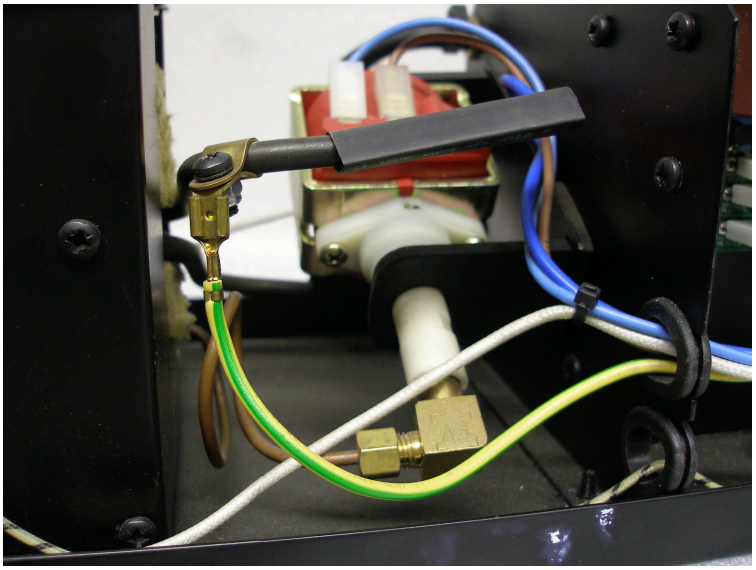
1. Always try to change a ***HEAT EXCHANGE*** when it is cold as the exposed metal parts can be **VERY HOT**.
2. ***DISCONNECT FROM MAINS SUPPLY.***
3. Remove ***TOP COVER.***
4. Disconnect the ***THERMOCOUPLE*** from the ***MAIN PCB.***
5. Disconnect the ***HEAT EXCHANGE POWER WIRES*** from the terminals of the ***PCB.***
6. Remove the negative (***BLUE***) wire from the heater.
7. Undo the brass nut that connects the ***BRASS ASSEMBLY*** to the ***HEAT EXCHANGE*** and disconnect the fluid line from the pump.
8. Undo the 4 screws that hold the ***HEAT EXCHANGER*** to the ***CHASSIS.***
9. Withdraw the ***NOZZLE*** of the heater through the hole and remove the heat exchange from the chassis***.***

Refitting Your New Heater:

1. Replace heat exchange in chassis ***NOZZLE FIRST***.
2. Screw the 4 screws back in through the bottom of the chassis
3. Replace the negative (***BLUE***) wire to the ***HEAT EXCHANGER ELEMENT***.
4. Reconnect the ***HEATER POWER*** wires to the ***TERMINALS*** *of the* ***PCB.***
5. Using a ***NEW OLIVE*** refit the ***COPPER FLUID LINE*** to the ***PUMP***.
6. ***RECALIBRATE*** the temperature of the unit. (***See Calibration Section***)

How To Change A Pump:

1. ***DRAIN ALL FLUID FROM THE SYSTEM FIRST.***
2. ***DISCONNECT FROM MAINS SUPPLY.***
3. Remove ***TOP COVER***.
4. Disconnect the ***POWER*** wires from the ***PUMP***.
5. Disconnect the ***BLACK RUBBER FLUID LINE*** from the rear of the ***PUMP***.
6. Move the fluid line out of the way. (***BE CAREFUL OF FLUID COMING BACK DOWN THE PIPE***)
7. Disconnect the ***COPPER FLUID LINE*** from the front of the pump.



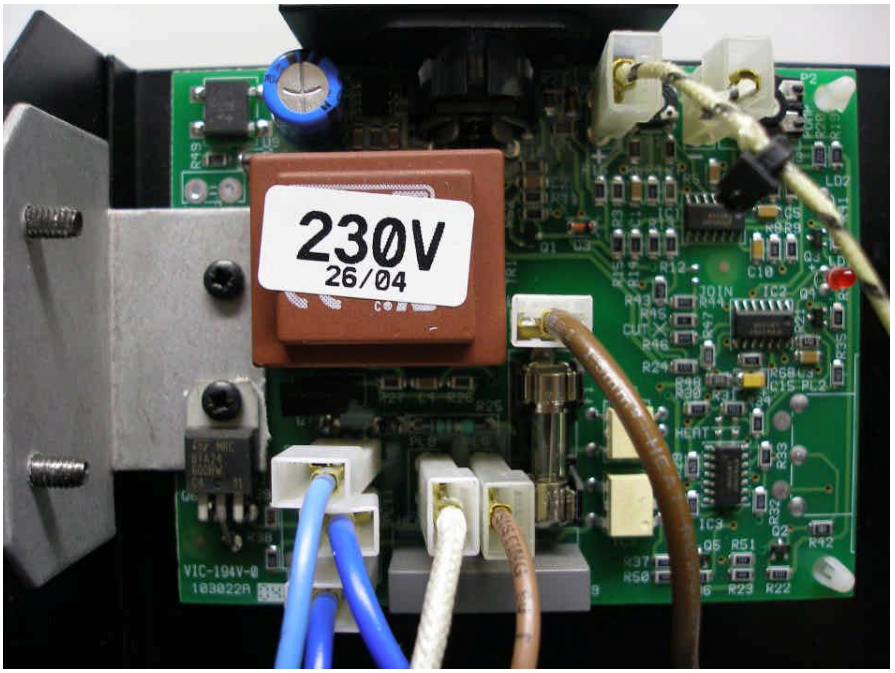
8. Unhook the rear ***RUBBER MOUNT*** from the pump.
9. Withdraw the pump from the front ***RUBBER MOUNT.***
10. Remove the ***PUMP*** from the machine.
11. Remove the ***BRASS FITTING*** from the front of the ***PUMP.***

REFITTING:

12. Fit the ***BRASS FITTING*** to the front of the pump using a ***THREAD SEALANT COMPOUND.***
13. Fit the new ***PUMP*** to the ***CHASSIS*** by inserting the front end first into the ***RUBBER MOUNT.***
14. Hook the rear mount onto the back of the pump.
15. Reconnect the ***BLACK RUBBER PIPE***.
16. Reconnect the ***POWER*** wires to the ***PUMP*** – ***BROWN INSIDE / BLUE OUTSIDE.***
17. Turn machine on and ***RE-PRIME*** the system.
18. Refit ***TOP COVER***.

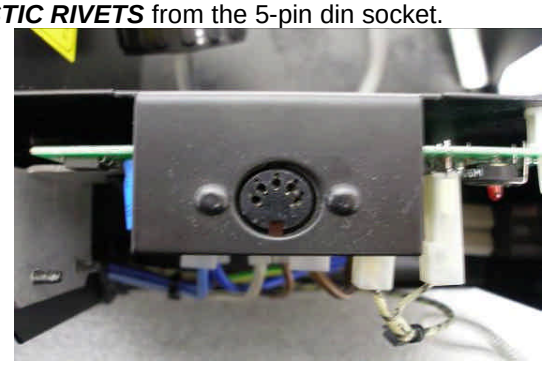
How To Change A PCB:

REFER TO SCHEMATICS / DIAGRAMS IN THE APPENDIX FOR MORE DETAILS



PCB

1. ***DISCONNECT FROM MAINS SUPPLY.***
2. Remove ***TOP COVER***.
3. Remove the 2 screws at the bottom of the ***PCB HEATSINK*** from ***INSIDE THE HEATER COMPARTMENT***.
4. Disconnect the ***PCB WIRING LOOMS*** from the ***PCB*** (Note orientation before removal).
5. Remove the 2 ***PLASTIC RIVETS*** from the 5-pin din socket.



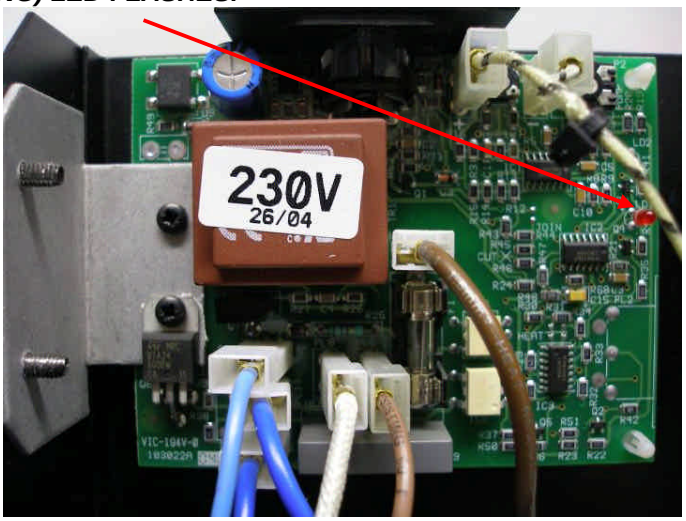
6. The ***PCB*** is mounted on 2 mounting posts which will need to be squeezed to remove the pcb.
7. Remove the ***HEATSINK*** from the ***PCB*** by removing the 2 screws/nuts/washers.

REFITTING:

8. Fit the ***HEATSINK*** to the ***PCB*** using the 2 screws/nuts adding ***THERMAL TRANSFER PASTE*** underneath component ***Q6.***
9. Fit new ***PCB*** to the mounting posts.
10. Insert the 2 ***PLASTIC RIVETS*** into the din socket.
11. Insert the 2 screws into the heatsink from the heater compartment.
12. Reconnect the ***PCB WIRING LOOMS*** (Observe polarity).
13. Refit the ***TOP COVER***.

Calibration:

1. Set the ***JEM CALIBRATION BOX*** to the required mV setting (13.4mV).
2. Make sure the ***RAMP BUTTON*** on your ***CALIBRATION BOX (GREY***) is ***OFF***.
3. Remove the ***TOP COVER***.
4. Disconnect the ***THERMOCOUPLE*** from the ***PCB***.
5. Connect the ***RED TERMINAL*** of the ***CALIBRATION BOX*** to the ***POSITIVE (+) THERMOCOUPLE*** connector of the ***PCB***.
6. Connect the ***BLACK TERMINAL*** of the ***CALIBRATION BOX*** to the ***NEGATIVE (-) THERMOCOUPLE*** connector of the ***PCB***.
7. Turn the machine on and tweak the ***TEMPERATURE CALIBRATION POT*** until the ***RED (HEATING) LED FLASHES.***



8. ***IF YOU PRESS THE RAMP BUTTON IN THE LED SHOULD GO OUT AND COME BACK ON AGAIN WHEN YOU RELEASE THE BUTTON.***
9. Disconnect the ***CALIBRATION BOX*** from the ***THERMOCOUPLE*** connectors.
10. Replace the ***THERMOCOUPLE*** onto the ***DMX/PROGRAM PCB (PRE 11/06: YELLOW = + BLUE = - / POST 11/06: BLACK = + WHITE = -)***
11. Turn the machine on and check for current draw.
12. Let the machine heat up and check using a digital volt meter that the ***RED (HEATING) LED*** turns ***OFF*** at the correct point.
13. The ***GREEN (OK) LED*** should turn on about 1mV lower than the peak temperature setting. ***(RED LED TURNING OFF)***
14. ***TEMPERATURE CALIBRATION IS NOW COMPLETE***.

SPARE PARTS LISTS

240V

Part	Description	Spare Part Number	Comments
PUMP	PUMP	05761003	240V RED BODY (LARGE)
PCB	MAIN	62020005	MAIN CONTROL PCB - TESTED
PCB	REMOTE	62020008	TESTED w/o BUTTON TOPS OR KNOBS
HEAT EXCHANGE	COMPLETE		COMPLETE BUILT UP HEAT EXCHANGE c/w BRASS FITTINGS
HEAT EXCHANGE	BARE Inc BRASSWORK	26400630	BARE EXCHANGE (No insulation or casework) c/w BRASS FITTINGS
HEAT EXCHANGE	BRASSWORK ONLY	26460030	BRASS FITTINGS ONLY
HEAT EXCHANGE	CASEWORK	n/a	CASEWORK AVAILABLE SEPARATELY - CONTACT jem-service@martin.dk
HEAT EXCHANGE	INSULATION	26520010	PRE CUT INSULATION KIT
HEAT EXCHANGE	THERMAL TRIP ONLY	05041021	TRIP SWITCH ONLY
HEAT EXCHANGE	THERMAL TRIP Inc LOOM		TRIP SWITCH INCLUDING HARD WIRED LOOM
CASEWORK	CARRY HANDLE (PLASTIC)	19200050	PLASTIC CARRY HANDLE
CASEWORK	TOP COVER	26560150	TOP LID / COVER
CASEWORK	MAIN CHASSIS	26560140	MAIN CHASSIS - BARE
OTHER	BOTTLE	34300001	9.5L FLUID BOTTLE
OTHER	REMOTE CONTROL	92765000	COMPLETE REMOTE CONTROL
OTHER	FLUID LINE	56220011	CLEAR FLUID LINE
OTHER	MAINS SWITCH	05523002	MAINS ON/OFF SWITCH
OTHER	WIRING LOOMS COMPLETE		ALL WIRING LOOMS FOR MACHINE
OTHER	STICKERS COMPLETE		ALL STICKERS / LABELS FOR MACHINE

110V

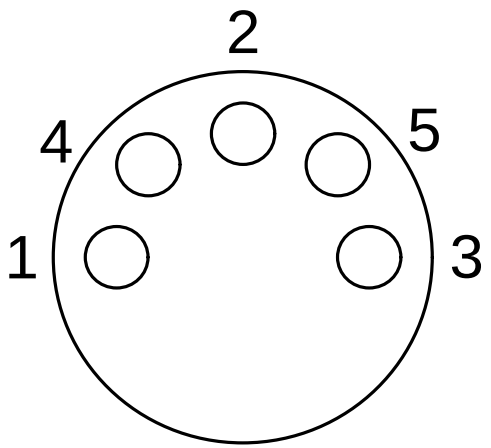
Part	Description	Spare Part Number	Comments
PUMP	PUMP	05761001	110V BLACK BODY (LARGE)
PCB	MAIN	62020007	110V MAIN CONTROL PCB - TESTED
PCB	REMOTE	62020008	TESTED w/o BUTTON TOPS OR KNOBS
HEAT EXCHANGE	COMPLETE		COMPLETE BUILT UP HEAT EXCHANGE c/w BRASS FITTINGS
HEAT EXCHANGE	BARE Inc BRASSWORK	26400820	BARE EXCHANGE (No insulation or casework) c/w BRASS FITTINGS
HEAT EXCHANGE	BRASSWORK ONLY	26460030	BRASS FITTINGS ONLY
HEAT EXCHANGE	CASEWORK	n/a	CASEWORK AVAILABLE SEPARATELY - CONTACT jem-service@martin.dk
HEAT EXCHANGE	INSULATION	26520010	PRE CUT INSULATION KIT
HEAT EXCHANGE	THERMAL TRIP ONLY	05041021	TRIP SWITCH ONLY
HEAT EXCHANGE	THERMAL TRIP Inc LOOM		TRIP SWITCH INCLUDING HARD WIRED LOOM
CASEWORK	CARRY HANDLE (PLASTIC)	19200050	PLASTIC CARRY HANDLE
CASEWORK	TOP COVER	26560150	TOP LID / COVER
CASEWORK	MAIN CHASSIS	26560140	MAIN CHASSIS - BARE
OTHER	BOTTLE	34300001	9.5L FLUID BOTTLE
OTHER	REMOTE CONTROL	92765000	COMPLETE REMOTE CONTROL
OTHER	FLUID LINE	56220011	CLEAR FLUID LINE
OTHER	MAINS SWITCH	05523002	MAINS ON/OFF SWITCH
OTHER	WIRING LOOMS COMPLETE		ALL WIRING LOOMS FOR MACHINE
OTHER	STICKERS COMPLETE		ALL STICKERS / LABELS FOR MACHINE

APPENDIX

Fuse Ratings

Fuse	**240V**	**110V**
Internal	6.3A	10A

MAGNUM 800 REMOTE CONTROL DIN PLUG PIN OUTS



1 - YELLOW (READY).

4 - WHITE (HEAT).

2 - BLACK (GND).

5 - BLUE (0 - 10v)

3 - RED (+16v).

VIEWED FROM THE SOLDER SIDE OF THE DIN PLUG

PIN OUT DESCRIPTION

1, GND WHEN MACHINES UP TO TEMPERATURE

4, GND WHEN MACHINES HEATING

2, GND

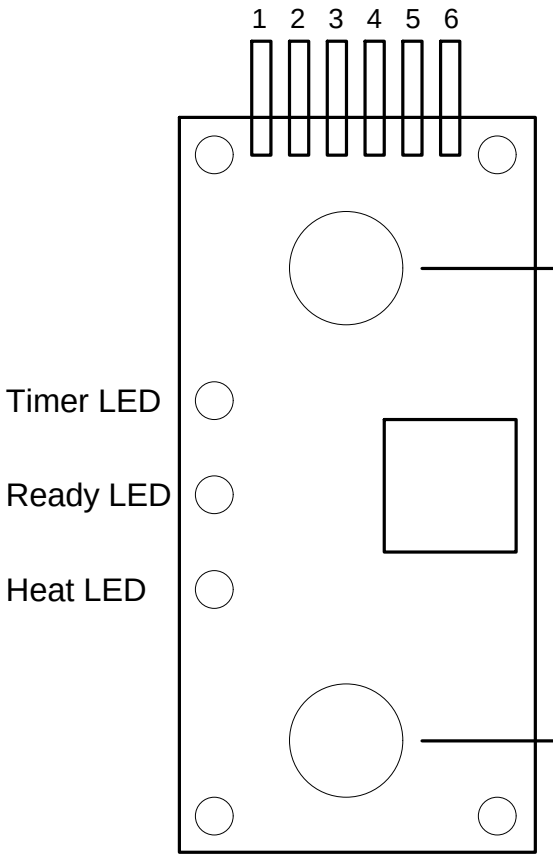
5, 0 - 10v INPUT, NEEDS 1.5v TO HEAT AND
2v -10v PUMP SPEED WHEN MACHINES READY

3 +16v OUTPUT

Magnum 800 Remote Plug Pin
Drawing No. 2000-1A
Drawn by: GS 28/03/2006

Jem

MAGNUM 800 REMOTE PCB PIN OUTS



PIN
1, Not Used
2, RED (+16v output)
3, BLUE (0-10v input)
4, BLACK (GND)
5, WHITE (Heat)
6, YELLOW (Ready)

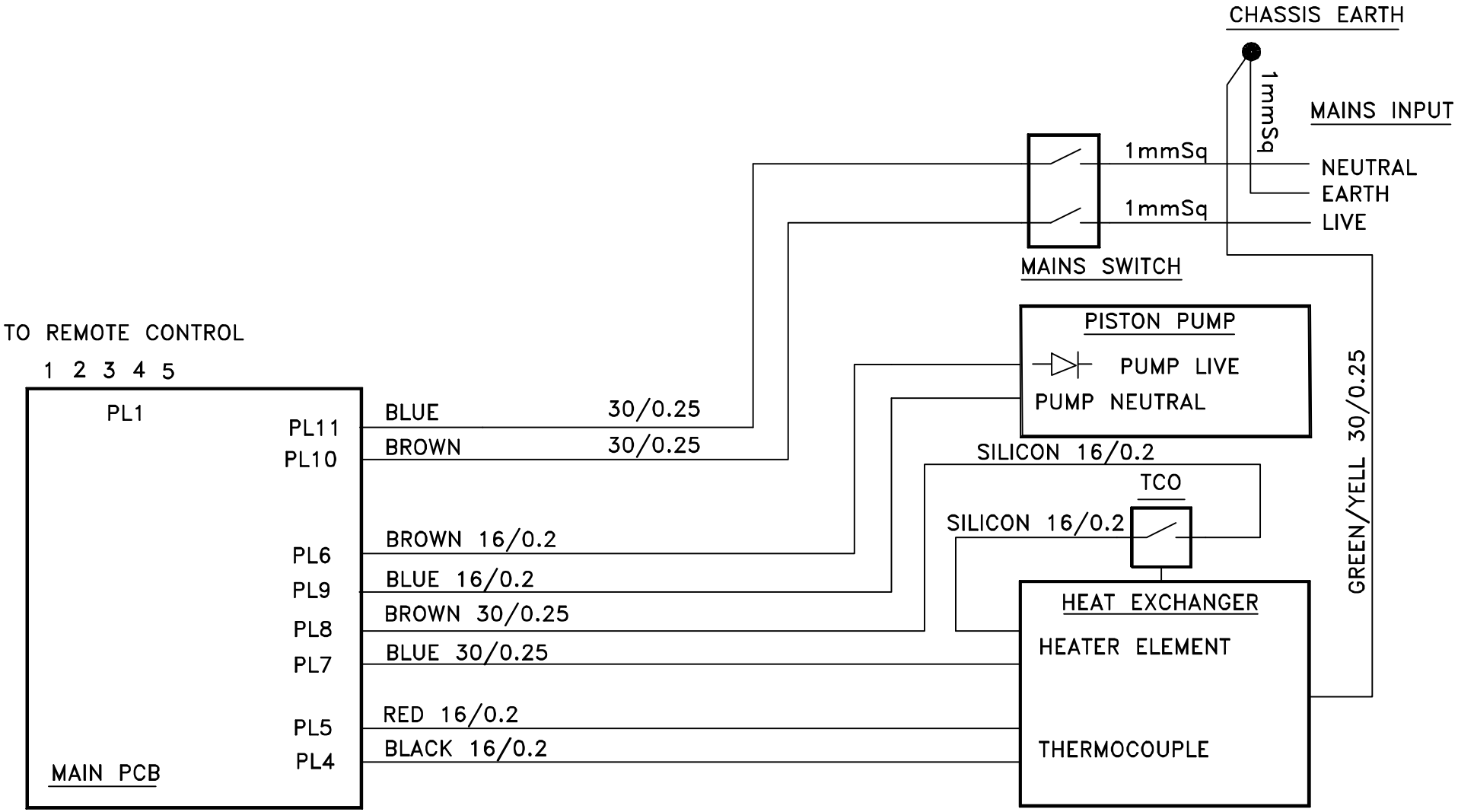
Timer control

Fog button

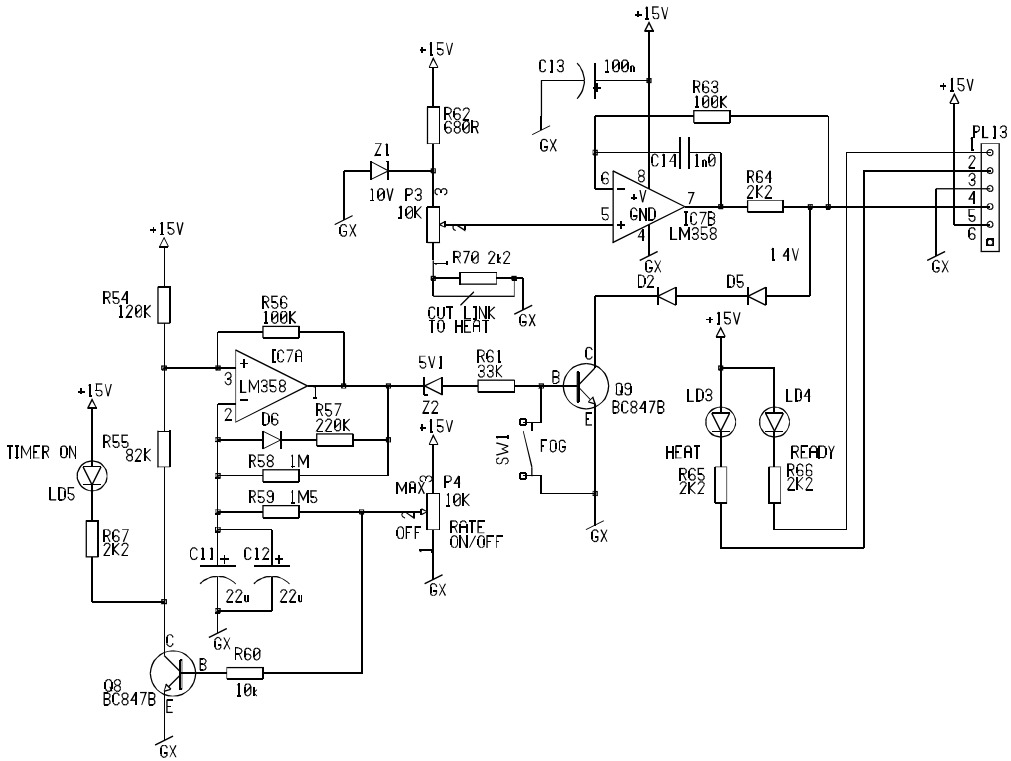
Output Level Control

MAGNUM 800 REMOTE
PCB PIN OUTS
Drawing No. 2000-2A
Drawn by : GS 28/03/2006

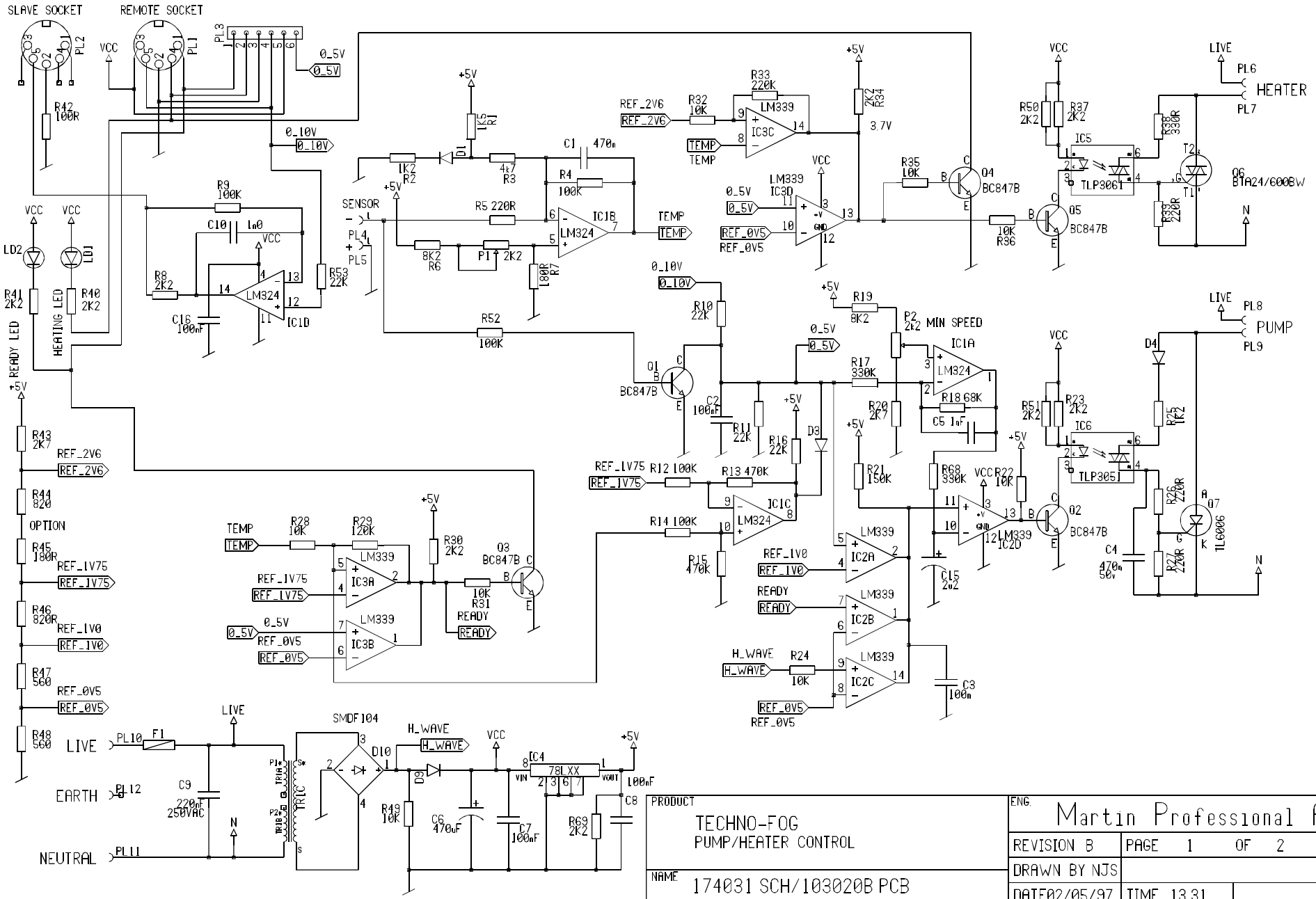
Jem

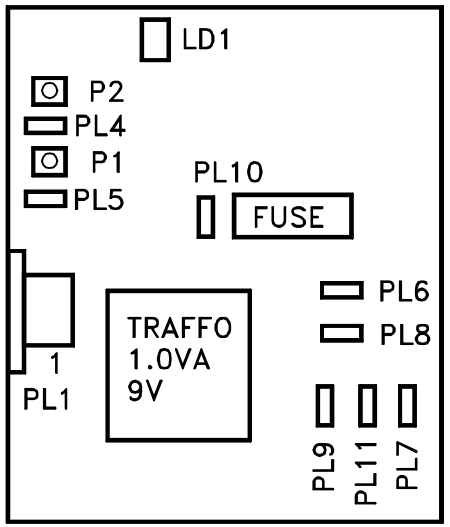


DRAWN: N.SCULLY *DATE:* 12/11/98 *TITLE:* TECHNO–FOG WIRING DIAGRAM *DWG. No.* 174030 *REV.* A



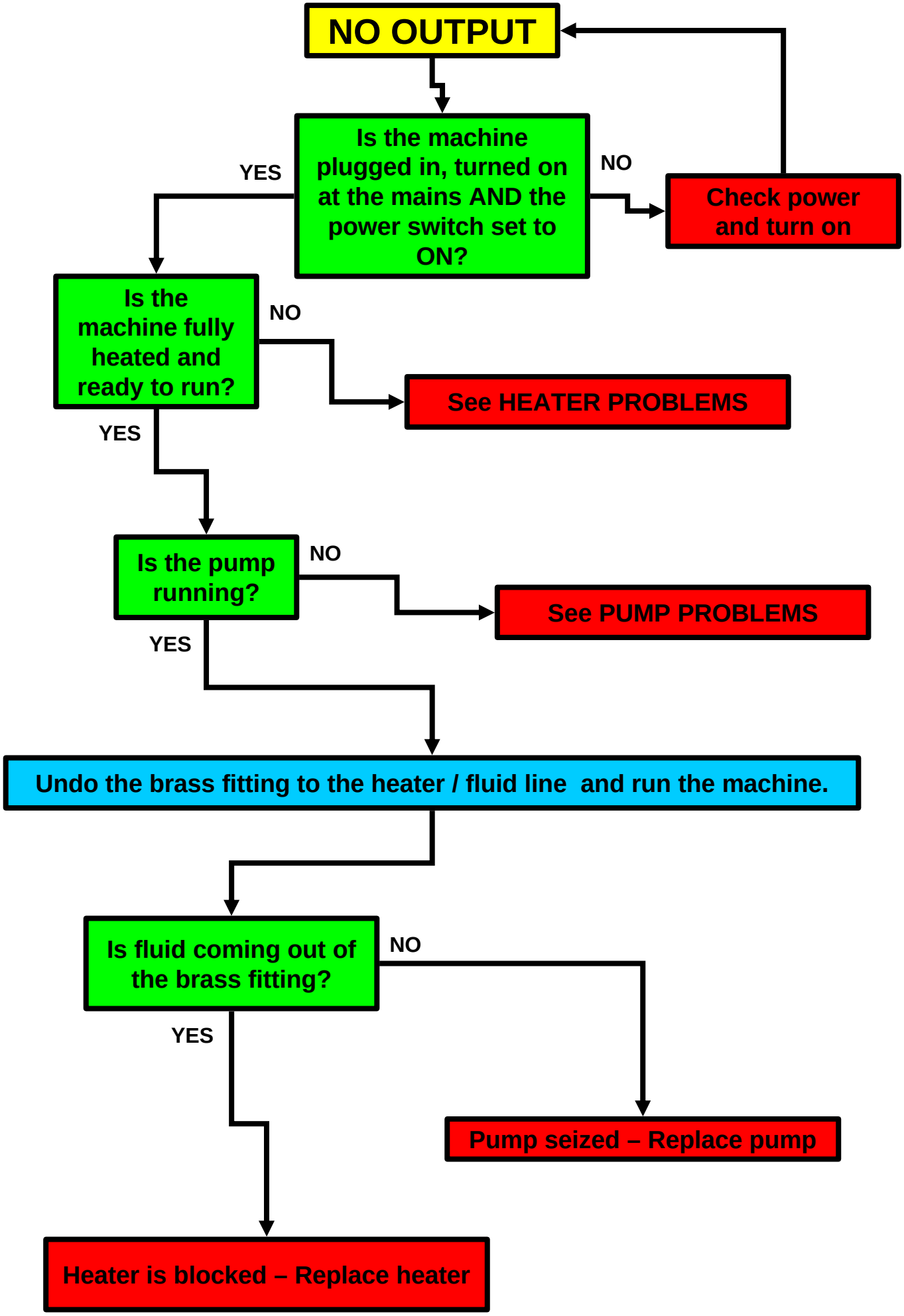
PRODUCT: TECHNO-FOG REMOTE CONTROL	ENG. Martin Professional A/S	
	REVISION B	PAGE 2 OF 2
	DRAWN BY NJS	
NAME: 174031 SCH/103020B PCB	DATE02/05/97	TIME 16 50

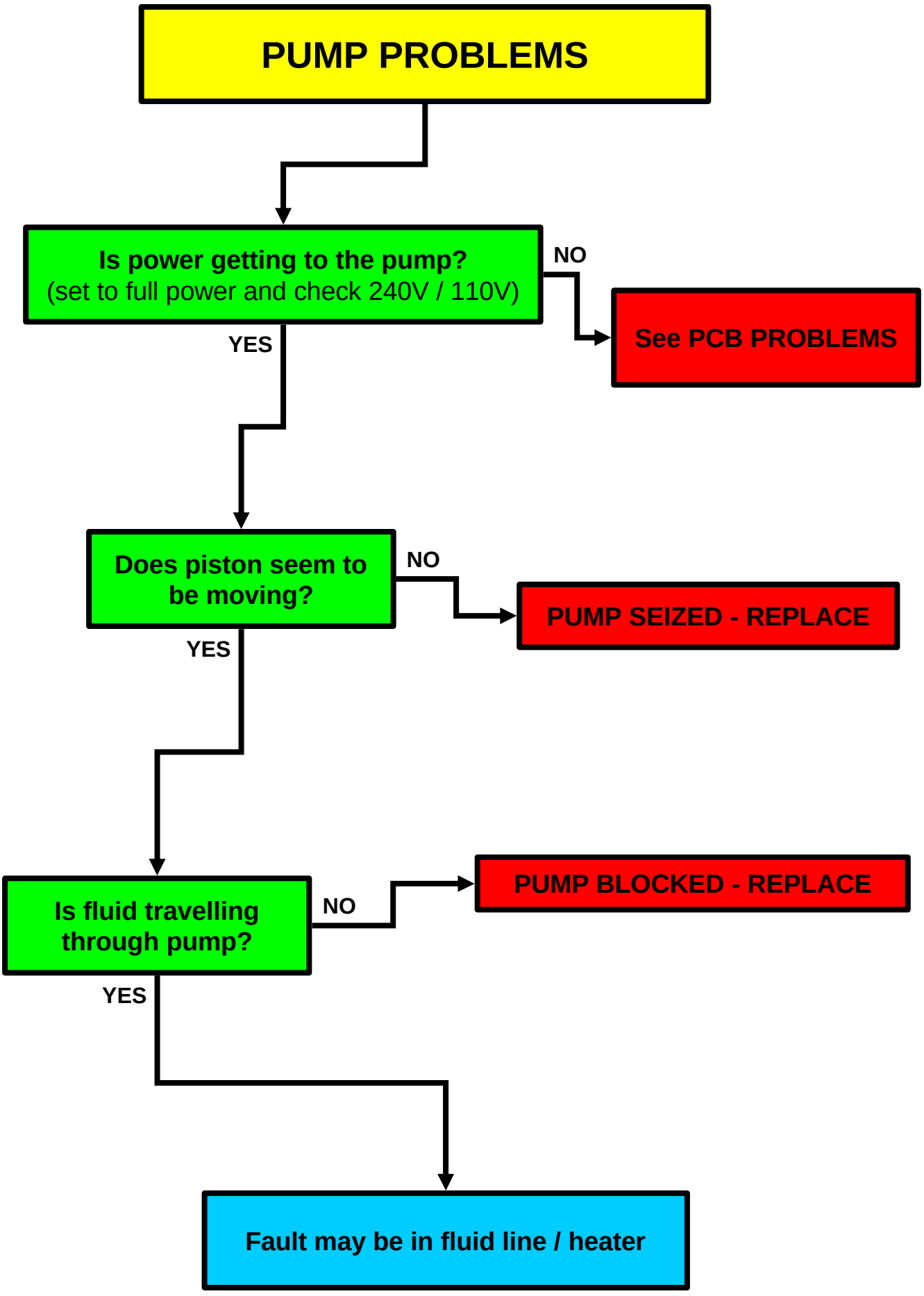

SLAVE SOCKET
REMOTE SOCKET
PL1
PL2
PL3
VCC
0_5V
0_10V
R42 100R
LD2
LD1
R41 2K2
R40 2K2
READY LED
HEATING LED
R9 100K
C10 1n0
R8 2K2
C16 100nF
LM324
IC1D
R53 22K
SENSOR
PL4
PL5
+5V
1K2 R2
D1
4k7 R3
C1 470n
R4 100K
R5 220R
8K2 R6
P1 2K2
180R R7
IC1B
TEMP
R52 100K
R10 22K
Q1 BC847B
C2 100nF
R11 22K
R16 22K
D3
R12 100K
R13 470K
R14 100K
R15 470K
IC1C
R19 8K2
P2 2k2 MIN SPEED
IC1A
R17 330K
R18 68K
C5 1nF
R20 2K7
R21 150K
R68 330K
R22 10K
C15 2u2
IC2D
IC2A
IC2B
IC2C
LM339
REF_2V6
R32 10K
R33 220K
2K2 R34
3.7V
IC3C
IC3D
R35 10K
Q4 BC847B
R36 10K
Q5 BC847B
R50 2K2
R37 2K2
IC5
TLP3061
R38 330R
R39 220R
T2
T1
Q6 BTA24/600BW
LIVE
PL6
HEATER
PL7
N
R51 2K2
R23 2K2
IC6
TLP3051
R25 1K2
R26 220R
R27 220R
Q7 TL6006
PL8
PUMP
PL9
C4 470n 50v
R43 2K7
R44 820
OPTION
R45 180R
R46 820R
R47 560
R48 560
REF_1V75
REF_1V0
REF_0V5
R28 10K
R29 120K
IC3A
IC3B
R30 2K2
Q3 BC847B
R31 10K
READY
R24 10K
H_WAVE
LIVE
PL10
F1
EARTH
PL12
NEUTRAL
PL11
C9 220nF 250VAC
SMDF104
D10
D9
R49 10K
C6 470uF
C7 100nF
IC4 78LXX
VIN
VOUT
100nF
R69 2K2
C8
C3 100n
PRODUCT
TECHNO-FOG
PUMP/HEATER CONTROL
NAME
174031 SCH/103020B PCB
ENG.
Martin Professional A/S
REVISION B
PAGE 1 OF 2
DRAWN BY NJS
DATE02/05/97
TIME 13 31

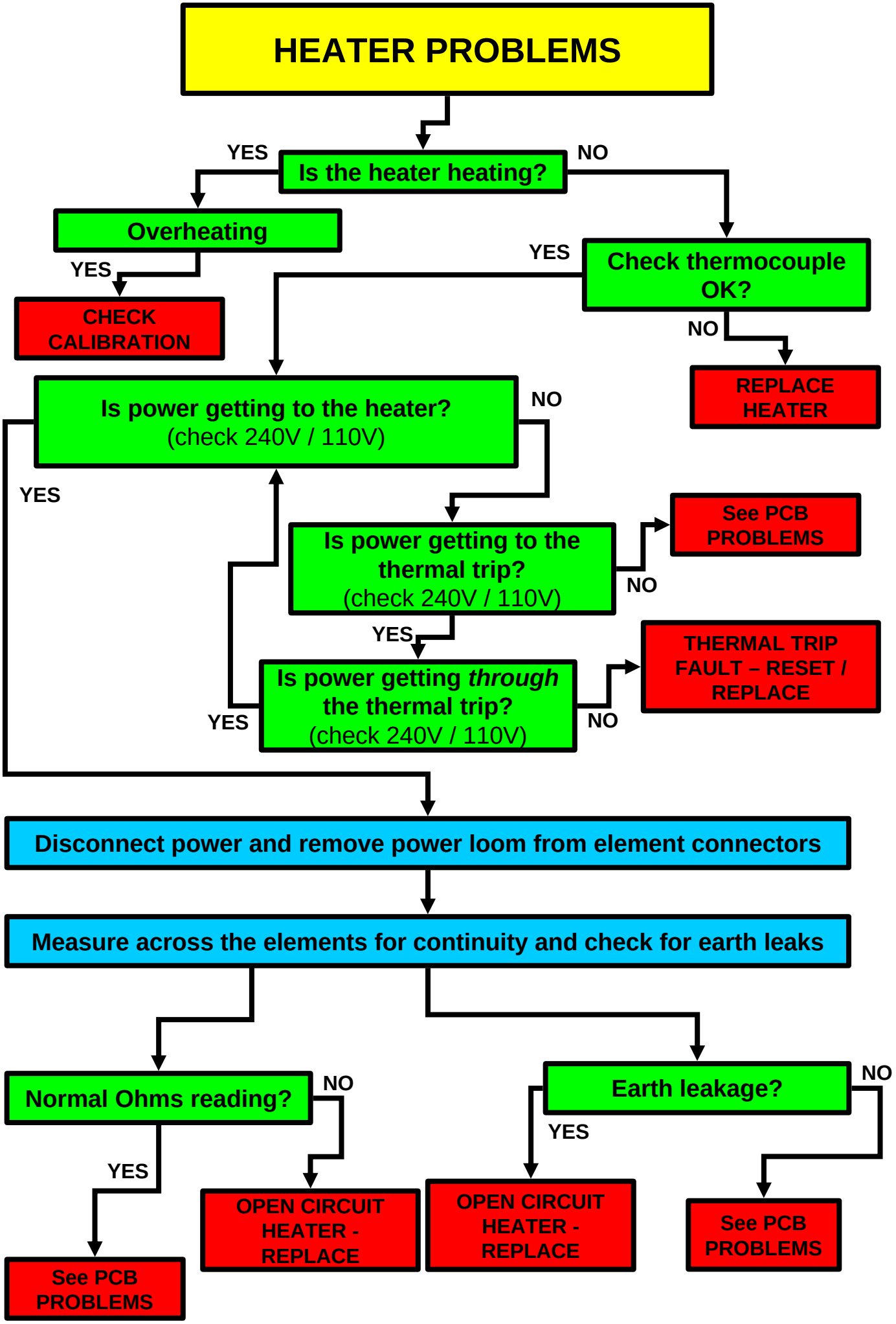


CONNECTOR FUNCTIONS		
PL1	1	READY LED (ACTIVE LOW)
	2	GROUND
	3	15V UNREG. SUPPLY
	4	HEATING LED
	5	0/10V INPUT SIGNAL
PL4	1	THERMOCOUPLE –VE
PL5	1	THERMOCOUPLE +VE
PL6	1	LIVE TO PUMP
PL7	1	NEUTRAL TO HEATER
PL8	1	LIVE TO HEATER
PL9	1	NEUTRAL TO PUMP
PL10	1	LIVE INPUT
PL11	1	NEUTRAL INPUT
P1	TEMPERATURE CONTROL	
P2	PUMP SPEED CONTROL	

DRAWN: N.SCULLY *DATE:* 12/11/98 *TITLE:* TECHNO–FOG MAIN PCB LAYOUT *DWG. No.* 174030 *REV.* A


NO OUTPUT
Is the machine plugged in, turned on at the mains AND the power switch set to ON?
YES
NO
Check power and turn on
Is the machine fully heated and ready to run?
NO
See HEATER PROBLEMS
YES
Is the pump running?
NO
See PUMP PROBLEMS
YES
Undo the brass fitting to the heater / fluid line and run the machine.
Is fluid coming out of the brass fitting?
NO
YES
Pump seized – Replace pump
Heater is blocked – Replace heater


PUMP PROBLEMS
Is power getting to the pump?
(set to full power and check 240V / 110V)
NO
See PCB PROBLEMS
YES
Does piston seem to be moving?
NO
PUMP SEIZED - REPLACE
YES
Is fluid travelling through pump?
NO
PUMP BLOCKED - REPLACE
YES
Fault may be in fluid line / heater


HEATER PROBLEMS
Is the heater heating?
YES
NO
Overheating
YES
CHECK CALIBRATION
Check thermocouple OK?
YES
NO
REPLACE HEATER
Is power getting to the heater? (check 240V / 110V)
NO
YES
Is power getting to the thermal trip? (check 240V / 110V)
See PCB PROBLEMS
NO
YES
Is power getting *through* the thermal trip? (check 240V / 110V)
THERMAL TRIP FAULT – RESET / REPLACE
YES
NO
Disconnect power and remove power loom from element connectors
Measure across the elements for continuity and check for earth leaks
Normal Ohms reading?
NO
YES
See PCB PROBLEMS
OPEN CIRCUIT HEATER - REPLACE
Earth leakage?
NO
YES
OPEN CIRCUIT HEATER - REPLACE
See PCB PROBLEMS

PCB PROBLEMS

APART FROM THE OBVIOUS FUSES / WIRING ETC. PCB FAULT FINDING IS TOO IN-DEPTH TO COVER HERE – PLEASE REFER SERVICING / REPAIR TO A QUALIFIED ENGINEER